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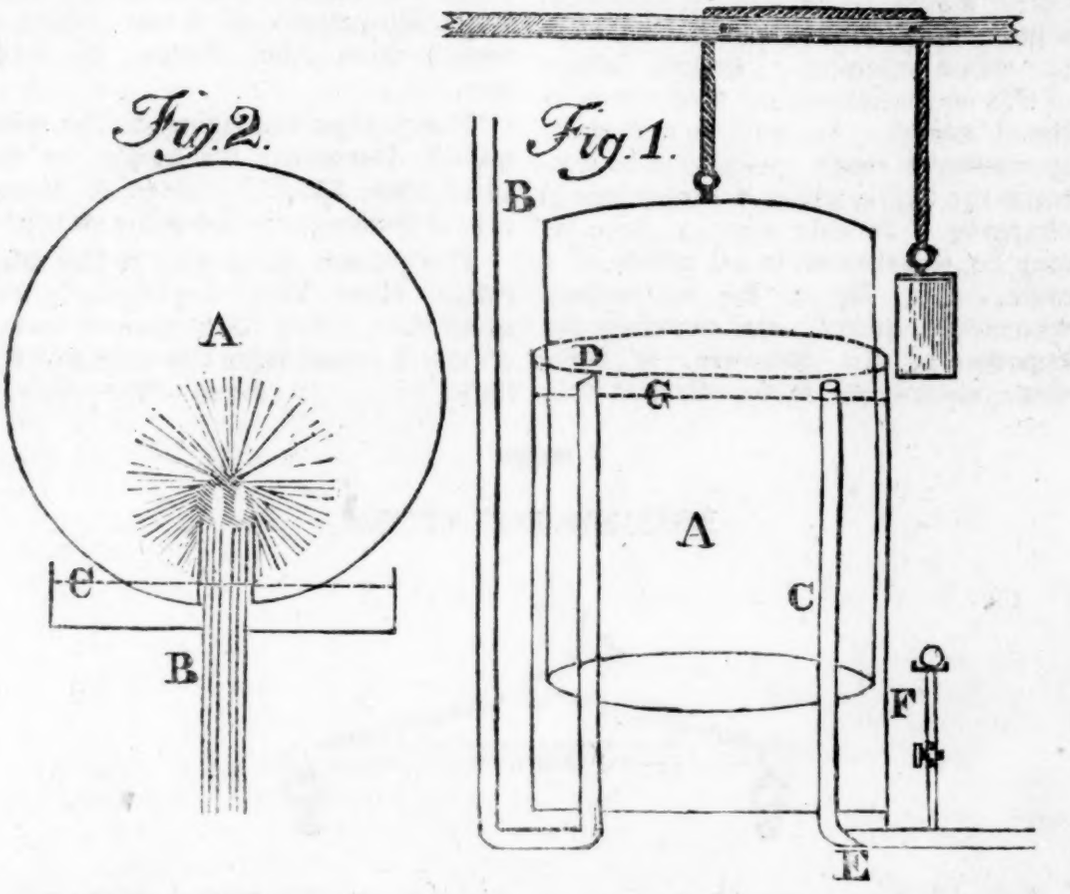
———"The charm dissolves apace;
And as the morning steals upon the night,
Melting the darkness, so their rising senses
Begin to chase the ignorant fumes that mantle
Their clearer reason." *Shakspeare.*

SAFETY LAMPS FOR LIGHTING MINES; PROPOSED BY E. CLARK.



The distressing explosions which sometimes take place in collieries, and which, all the plans hitherto suggested have, so far as our knowledge extends, failed to prevent, may, it seems probable, be obviated by the adoption of an apparatus similar to the annexed figures.

Explanation of the Drawing.

Fig. 1.

A represents a gasometer suspended in a reservior of water.

B, a supply pipe leading to any point where pure atmospheric air may be obtained, and furnished with a retaining valve, as shown at D.

C, eductıng pipe, for the distribution of air to the lamps.

E, valve to maintain the pressure in the pipes, while the gasometer is charged with air.

F, lamp supported on a pipe which is regulated by a stop-cock.

G, water line in the reservoir.

Fig. 2.

A, section of a globular glass lamp, supported on one or more pipes, accordingly as the air to support the flame may be distributed, or as gas or oil may be used for its production.

B, longitudinal section of the lamp—supporting pipes, designed for the use of

gas, and a supply of atmosphere on sides of the flame.

C, a reservoir of water, connected to the lamp pipe, so that the bottom part of the glass may dip a little in the water, for the purpose of preventing the accession of the exterior air into the lamp.

NOTE.—There is an opening in the bottom of the glass, through which the water passes into the lamp when not lighted; but when lighted, and made to communicate with the gasometer, it is forced back into the reservoir by the condensed air in the lamp, which, being no longer serviceable to combustion, escapes through the same opening. Portable lamps of this construction may sometimes be found useful. It may be necessary to employ a small gasometer to continue the light while a larger one is charging. In this manner pure air may be distributed to all parts of a mine, and lights be maintained wherever required; and certainly the expense of this measure, or some other, equally or more efficient one, when compared with the safety it would secure to a highly useful class of people, does not deserve a serious thought.

POWER OF THE PUMPS IN SOME CORNISH MINES.

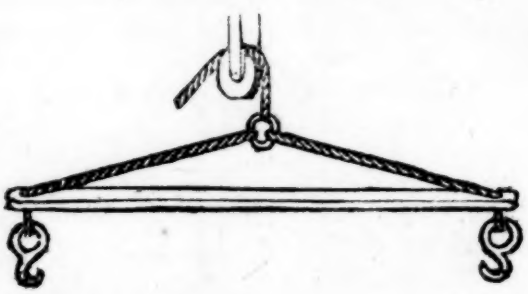
The quantity of water discharged by pumps from many of the Cornish mines is very considerable.

The pumps belonging to the mine called Huel Abraham, discharge, every twenty-four hours, no less than 2.092,320 gallons of water, which is raised from the depth of 1440 feet.

The pumps belonging to the mine called Dolcoath, discharge in the same time, 535,173 gallons of water, raised from nearly the same depth.

The pumps belonging to the mine called Huel Vor, dischage, in the same time, 1.692,600 gallons of water, which is raised from the depth of 950 feet. *Lond. Mec. Jour.*

BOILING POTATOES.



SIR,—I beg leave to mention an economical plan, by which a large quantity of potatoes may be boiled with very little fuel. For this purpose I have two strong close-worked wicker baskets, which fit the inside of my copper, each holding a bushel; these, when filled with potatoes, are lowered into, and lifted out of the copper by a pulley, fixed above, and a rope, to which is suspended a stretcher and hooks, similar to what I have seen used in London to crane up crates of glass, earthen ware, &c. with (see prefixed figure.) By this contrivance, the hot water * drains away from the potatoes, when boiled, into the copper, and is ready boiling for the other basket to be immersed. By this plan a large quantity may be boiled quickly in succession, with a trifling addition of fuel, and now and then supplying the waste of water

* I believe the water in which potatoes and other roots are boiled is noxious in its qualities; perhaps it is owing to this being commonly retained with the potatoes, or to giving potatoes raw, or giving a bad sort to pigs, that Bonington Mowbray says they are injurious, and deteriorate the meat. I have fatted many with half mealy potatoes (golden duns) and half barley flour, and my bacon has been generally much admired.

caused by evaporation. I have had this machine in use three winters, and, by these contrivances, a boy, about 16 years old, washed and boiled for me, in one winter's day, about 22 bushels of potatoes, besides picking them up and bringing them about 40 or 50 yards to the pump.

C. W.

Lond. Mech. Mag.

TO MAKE TOMATTA CATSUP.

Take the required quantity of ripe Tomattas, wipe dry, put them into an earthen or tinned vessel in a warm oven or over a moderate fire without boiling, till they are quite soft; then separate the liquor from the pulp, first through a cullender, and then through a cloth; salt freely, add Cayenne and black pepper and spice according to taste, with cloves, mace, nutmeg, &c. Boil, cool, add good vinegar to suit the palate, bottle and use of it as you like.

The above should be highly seasoned. It forms an excellent catsup, and may be used without any apprehension, which is more than can be said for some other kinds used as condiments on our tables.

New-York. A SUBSCRIBER.

ON THE FLEXIBILITY AND STRENGTH OF MARBLE.

Several experiments were made on the flexibility and strength of the white statuary marble, by Mr. Tredgold.

The marble was of a very regular grain, free from veins or other seeming defects; its specific gravity was 2.706, and it absorbed one 1300th of its weight of water.

The short specimens were the pieces broken off the longer one.—They were supported at each end upon iron supports; the scale for the weights was suspended from the middle. The scale and its apparatus weighed 10lbs. A silk line, fastened to the middle, moved a lever index, by which the depression was so multiplied that a very small quantity could be measured. The index was always allowed to become stationary before another weight was added: the time which elapsed before this index became stationary always increased sensibly towards the end of the experiment.

A piece of this marble, 1.075 inches in depth, and the same in breadth, placed on supporters at the distance of 30 inches, was depressed as follows:—

By 10lbs. . . .	0.021 inch.
20	0.043
30	6.061
40	0.081

By 50lbs. it broke, but evidently by the momentum the weight acquired by the addition of the last 10lbs.

A piece, 1.08 inches in depth, and 1.05 inches in breadth, placed on supports at the distance of 14 inches, was depressed

By 10lbs. . . .	0.005 inch.
20	0.01
30	0.012
40	0.015
50	0.017
60	0.02
70	0.21
80	0.25
90	0.3
100	0.035
110	it broke.

A piece, 1.075 inches in depth, and the same in breadth, placed on supports 14 inches apart, was not sensibly depressed by 10 lbs., but

By 20lbs. . . .	0.005 inch.
30	0.01
40	0.012
60	0.015
70	0.02
90	0.025
100	0.027
110	0.03
120	0.035
130	0.037

It bore this weight for some time, and then broke. In all the three pieces, the plane of the fracture made nearly the same angle, of 83 degrees, with the axis of the piece; an effect not observed by Mr. Tredgold with any other stone.

Lond. Mech. Jour.

EVAPORATION.

It appears, from a long series of observations made by Dr. Bostock, that the following is the comparative rate of Evaporation, during the different months of the year, from a circular area of water, two inches in diameter.

For January . . .	·287 gr. per hour.
February . . .	·400
March	·393
April	—no observation
May	·897
June	·930
July	·983
August	·932
September . . .	·555
October	·346
November . . .	·369
December . . .	·392

The average of the whole is 501 gr. per hour.

The greatest quantity of evaporation in one hour was 1·75 gr.; it was on the 4th of August, 1813; the least quantity of evaporation was on the 12th of November, 1812, when no loss of weight could be perceived.—The greatest winter evaporation was on the 28th of November, 1812, amounting to 1 08 gr.; and the least summer evaporation on the 5th of August, 1813, amounting to ·25 gr. per hour.

It appears that when the state of the atmosphere is attended by either a very low or a very high barometer, it is less favourable to evaporation than the intermediate state. Nor does it seem unreasonable that this should be the case. Damp or wet weather, which is generally accompanied by a low barometer, is obviously unfavourable to evaporation;—while, when the barometer is high, the atmosphere may be supposed to be more nearly saturated with moisture, and therefore less disposed to receive an additional quantity.

A close connexion was also observed between temperature and the rate of evaporation

Lond. Mec. Mag.

PRUDENTIAL MAXIMS.

If you would be wealthy, think of saving as well as getting.

It often costs more to maintain one vice than to bring up two children.

If goods are sold ever so cheap, and you do not need them, they are too dear for you to purchase; for if you buy what you do not deed, you soon may have need to sell your necessaries.

Lond. Mec. Mag.

ISOMETRICAL DRAWING.

(By Professor Farish.)

Abridged from the "Transactions of the Cambridge Philosophical Society."

Whoever has attended but a little to the niceties of the graphic art, must have observed with what difficulty a complicated machine is duly represented on paper. The common principles of perspective will avail but little in exhibiting on a a *given scale* a complicated series of mechanical instruments, or even in forming the ground-plan of any large building.—Another method has therefore been invented, which, from the principles involved, is denominated *Isometrical*.

The principles of this method are clear to every one who has a moderate knowledge of Euclid. They are fully developed in the fifteenth proposition of the fourth book of the Elements—the inscription of a hexagon in a circle, and the converse. If our readers will turn to the figure there given, they will perceive that the side of the hexagon is equal to the radius of the circumscribed circle; and that three radii, one of which must be vertical, drawn from the angles of the inscribed figure, and containing with each other angles of 120 degrees, complete the figure of a cube. Now the figure of a *projected* cube is a regular hexagon. And the three lines, which we have mentioned as completing the outline of the cube, will be properly represented in any projected figure. These lines are called by the Professor, the *dexter*, the *sinister*, and the *vertical* isometrical lines.—The angles which these lines form individually with the sides of the cube, are angles of 60 degrees; and the angle contained by the dexter and sinister is that of 120 degrees, which is the case in a projected figure, whose right angles always appear equal to one of these; consequently, by the assumption of three lines drawn through any regulating point at the angles above named, the direction of the superficial planes may be determined; and points in these planes being assumed as new '*regulating points*,' the principal parts of the object to be delineated may

be accurately noted in the drawing. This plan will suffice for the representation of objects, of which right lines will form the outline, and by means of points a curved line may be traced. 'But in representing machines and models, there are not only isometrical lines, but also many wheels working into each other, to be represented. These, for the most part, lie in the isometrical planes.' In this case, the Professor applies the ellipse, which is the authographic projection of the circle. The ellipse has long been in use in such cases, though never thus applied. Referring to the cube, it will be found, that the circle which may be inscribed in the rectangular faces of that figure, become perfect and equal ellipses on the drawing. Assuming these as wheels revolving, their axes will be found to be parallel to the other sides of the cube; and their diameters are isometrical and parallel to the other sides.—The minor axis, the isometrical diameter, and the major axis, are to one another as 28, 40, 49. And on this scale the plan of any object may be accurately laid down. By means of any number of these concentric ellipses, and the divisions of their circumferences into eight equal parts by the two axes, and two isometrical diameters, and their subdivisions at the will of the artist, the cogs of a wheel may be correctly traced. If the circle to be represented be *not isometrical*, still the same method will obtain; because, in whatever plane it lies, the major axis of the ellipse will be the same. Such is the plan of this perspective; by which every model, or machine, and every production of art, may be represented. Buildings, bridges, arches of all kinds, and the different apartments in a college or a palace may be correctly drawn by this method. A plan of a city, with all its streets and squares, and with a picture of its churches, and even private houses, might be given; if the elevation which this perspective supposes, will allow.

In cases where the lines are not isometrical, this art may be also applied, by drawing isometrical lines, or ellipses, as guides. An example of this is given in the delineation of an Etruscan vase, for which it is only necessary to draw a vertical line corresponding with its axis, and a few concentric ellipses in certain points of whose circumferences the outline of the figure lies. The timbers of a ship—illustrations of animals for the study of natural history—regular fortifications—the face of a mountainous country, with all its lakes, heights, and valleys, may be depicted by this method, and on any required scale.

To the geologist also it affords a help which he has not hitherto experienced; for the strata, inclination, and position of rocks, may be likewise accurately laid down; and by the mineralogist, in the measurement of his specimens, a means of representing their angles, planes, &c. is readily acquired.

[The plan or synopsis of the annual course of Lectures on Arts and Manufactures, more particularly such as relate to Chemistry, by Professor Farish, the author of this paper, is by far the completest that we have ever seen. The multiplicity of practical details which it indicates—details not to be gathered from books, nor otherwise than by long and laborious personal inquiry—struck us at first with wonder, and left, we will confess, an impression of incredulity on our minds. But all doubt on this subject has been removed by the following observations in the *Cambridge Review*, which we have much pleasure in quoting.

"We have often been surprised at the readiness displayed by Professor Farish in putting together those various and beautiful models which he exhibits in his annual course of lectures; and no little credit is due to him and his attendants for their ability. From a chaos of 'wheels, axles, bars, and clamps,' the Professor is enabled to call into being an infinity of most ingenious models, representing, with a precision and despatch almost wonderful, all 'the more important machines in use in the manufactures of Britain.' All instruments and engines of art and commerce, from the complex cotton-mill and steam engine, to the lowly, but most useful wheelbarrow, are built, and set in motion within the walls and on the table of the lecture-room; and no improvement takes place in any of them without the application of it to the models. By this means, at a vast expense, and an infinity of labour, by journeyings far and nigh, and unwearied perseverance and research, Mr. Farish has been enabled to exhibit to his pupils the sources of England's wealth—her machines and mills—which have justly made her the glory and the boast of the commercial world."]

Lond. Mec. Mag.

CENTRE OF GYRATION.

Let two spherical balls be made of different metals. as suppose of gold and silver, but exactly of the same weight and size ; so that the gold ball may assume the form of a spherical orb or hollow sphere ; now, if these balls be painted white, by what method can it be ascertained which is the golden ball and which the silver one?

Solution.

It has been ascertained by writers on fluxions, that the centre of gyration of a solid sphere is nearer to its centre than that of a hollow one of the same diameter and quantity of matter is to its centre.—And indeed it is evident ; because the inertia of each is as its quantity of matter multiplied by the square of its distance from the centre. Now, in the proposed gold and silver balls, the entire mass of the former is posited towards the surface, and its distance from the centre is greater than that of the latter ; and as these masses are the same, it follows that the inertia of the gold sphere is greater than that of the silver one ; whence arises the following mode of determination: Let the two spheres roll down an inclined plane ; observe that which rolls the quickest, or which has the greatest momentum in meeting the horizontal plane, for that is the ball of gold.

K. N

Lond. Mec. Mag.

COMMON SALT.

This is found in large masses, or in rocks, under the earth. In the solid form it is called *sal gem*, or rock salt. If it be pure and transparent, it may be immediately used in the state in which it is found ; but if it contain any impure earthy particles, it should be freed from them. In some countries it is found in incredible quantities, and dug up like metals from the bowels of the earth. In this manner has salt been dug out of the celebrated mines of Bochnia and Wieliezka, in Poland, ever since the middle of the thirteenth century. In these mines, which are said to reach to the depth of several hundred fathoms, 500 men are constantly employed. Though the salt mines of Wieliezka, near Cracow, in Poland, have long astonished the philosopher and the traveller, yet it deserves to be remarked, that the quantity of rock salt obtained from the mines of Northwich, in Cheshire, is greatly superior to that obtained at Cracow.

Besides the salt mines here mentioned, where the common salt is found in a concrete state, under the name of rock salt, there is at Cordova, in Spain, a remarkable solid mountain of rock salt ; this mountain is between four and five hundred feet in height, and a league in circuit: its depth below the surface is not known. This mountain contains the rock salt without the admixture of any other matter. The waters of the ocean every where abound with salt, though in different proportions. Besides common salt, these waters contain several other saline combinations, such as muriate of magnesia, sulphate of lime, &c. The whole art of extracting salt from waters consists in evaporating the water in the cheapest and most convenient manner. In England, a brine composed of sea water, with the addition of rock salt, is evaporated in large shallow iron boilers, and the crystals of salt are taken out in baskets. In Russia, the sea water is first frozen, and the ice, which is entirely fresh, being removed, the remaining brine is evaporated by boiling.

Lond. Mec. Mag.

THE ARRACACHA OF SOUTH AMERICA.

Those who are well acquainted with its qualities, describe it as one of the most useful of all the vegetables of South America, its root yielding a food which is prepared in the kitchens in the same manner as potatoes. It is extremely grateful to the palate ; so tender that it requires little cooking, and so easy of digestion that it is the common practicewhere it is cultivated, to give it to convalescents, and persons with weak stomachs, being considered of a much less flatulent nature than potatoes. Starch, and a variety of pastry are made of its fecula ; and reduced to a pulp, it enters the composition of certain fermented liquors, supposed to be very proper for restoring the lost tone of the stomach.

The Arracacha, though a native of Santa Fé, and other places in South America, thrives best in temperate climates. Its cultivation requires a deep black mould, and it is propagated by cutting the roots to pieces, each having a separate eye or shoot, and planting these in separate holes.

At the end of three or four months, the roots are of sufficient size and quantity to be used for ordinary purposes, and if al-

lowed to remain in the ground for six months, they increase to a great bulk, without their taste being any way altered. We understand the Arracacha has undergone such experiments in Scotland as to satisfy botanists there that it is much superior, in every respect, to the potatoe, which it is expected in a great measure to supersede. The potatoe was originally introduced into Europe from a warm climate, and has since become naturalized to the soil. In many parts of this country there can be no doubt the Arracacha might be cultivated with as much ease as the potatoe; and we hope thefore to see it ere long added to our articles of cheap food.

Lond. Mec. Mag.

ECHOES.

An echo is a reflected sound. The ancient philosophers were unacquainted with the true nature of the echo. The poets supposed it to have been a nymph, who pined into sound for love of Narcissus.—But the modern state of philosophy has established it upon unerring principles.—According to the various distances from the speaker, a reflecting object will return the echo of several, or of a few syllables; for all the syllables must be uttered before the echo of the first syllable reaches the ear, otherwise it will make a confusion.—In a moderate way of speaking, about three and a half syllables are pronounced in one second, or seven syllables in two seconds. From the computations of a short-hand writer, it appears that a ready and rapid orator in the English language pronounces from 7,000 to 7,500 words in an hour: namely, about 120 words in a minute, or two words in each second. Therefore, when an echo repeats seven syllables, the reflecting object is 1,142 feet distant; for since sound travels at the rate of 1,142 feet per second, the distance from the speaker to the reflecting object, and again from the latter to the former, is twice 1,142. When the echo returns fourteen syllables, the reflecting object must be 2,284 feet distant, and so on. A famous echo is said to be in Woodstock park, Oxford. It repeats seventeen syllables in the day time, and twenty at night, when, the air being somewhat denser, the sound does not travel quite so fast. There is also a remarkable echo on the north side of Shepley church, in Sussex, which will repeat distinctly twenty-one syllables. At Rosneath, near Glasgow, there is an echo that repeats the tune played with a trumpet three times completely and distinctly.

Lond. Mec. Mag.

CHLORINE.

The substance now known by the name of chlorine to chemists, was, up to the year 1810, called by them oxymuriate acid. The latter name was given to it on the supposition that it was a compound substance, consisting of muriatic acid and oxygen.—A different opinion was first formed perhaps about the year 1808, but it was in 1810 that Sir Humphrey Davy published his account of the experiments he had made on this substance, whence the conclusion was drawn that it was a simple substance, to which the name of chlorine was given from its yellow colour. Since that time the great majority of chemists have adopted the views of Sir Humphrey Davy, and chlorine appears in most of the elementary treatises on chemistry as a simple substance, classed along with oxygen, either from its electrical property, or from its being a supporter of combustion. It is a gaseous body, possessing all the mechanical properties of common air. Its colour, which is hardlyperceptible by candle light, is greenish yellow. Its taste is astringent. When breathed, mixed with atmospheric air, it produces a most insufferable sensation of suffocation, occasions violent coughing, with much spitting, followed by great debility; and if breathed in its pure state, it destroys life almost instantly. It possesses the very peculiar property of destroying all vegetable colours, and of rendering most substances white. This property has led to its employment as an agent in bleaching, and by it most of the cloths now manufactured in this empire are made of their dazzling whiteness. Mr. Scheele first observed this property in chlorine; M. Berthollet, a French chemist, first recommended its employment in bleaching; and the celebrated Mr. Watt, of Birmingham, was one of the first persons to introduce it into Great Britain.

London Chemist.

BORING FOR WATER.

To the Editor of the American Mechanics' Magazine.

It has been asserted that in boring the earth, as practised in Brunswick and other places, water may be brought to the surface on the summit of our highest hills, thereby prostrating the hypothesis of those

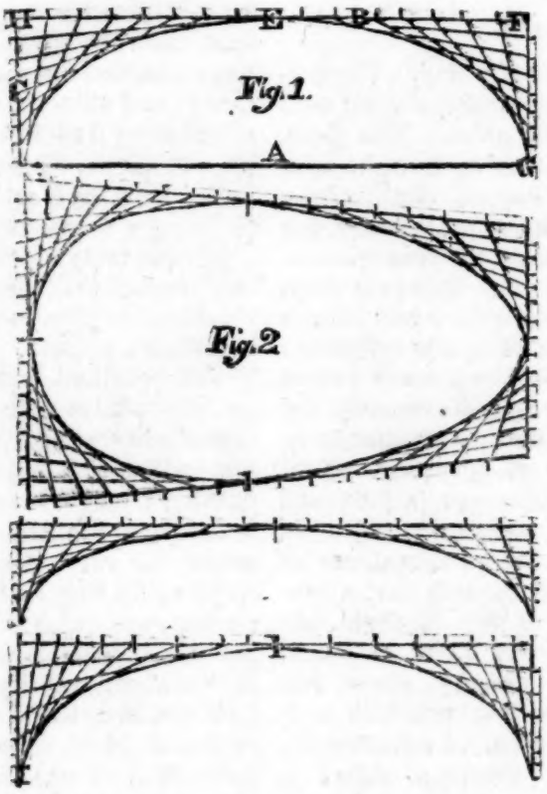
who imagine that the fountain head must be elevated above the plane of emission, and the fluid confined in a vein of clay, &c. which, on being tapped, allows the water to rise much in the same way that we receive that necessary of life from the Manhattan company—an inquiry has been made as to the reason of the assertion above, and having seen no reply, I beg leavê to suggest the following:—That on the supposition of water being contained within the bosom of the globe, may not its diurnal motion have the effect of giving the fluid a centrifugal impulse, thereby causing it to rush out of any passage that may be opened for its egress, as it may be supposed that the centrifugal impulse is greater than the attraction. These hints are only thrown together, hoping to elicit a spirit of inquiry from others who are more conversant with natural philosophy than I am, and at the same time to express a wish that I may meet with more remarks in your useful Magazine on the subject.

By inserting this you will oblige a constant reader.

H.

New-York, June 28, 1825.

FORMING AN OVAL, OR ELLIPSIS.



SIR,—The following method of drawing the Oval or Ellipsis, not generally known amongst mechanics, may prove useful to some of your numerous readers.

To form a semi-ellipsis, draw the line A, fig. 1, and at the height of the required arc, the parallel line B, and at the required length of the base the two lines C and D; equally divide the line B, as at E, and the portion of the line B from E to F, into as many equal parts as may be thought sufficient, and divide the line F G to answer to the line E F in number of divisions. Proceed the same with the lines H E and H I, and then draw the crossing lines, commencing at E; carry the line to the first division below F on one side, to the first division below H on the other, and the remaining lines as seen in the figure.

The method of drawing the oval, or egg-shape, will be easily seen by a reference to fig. 2. Any elliptical figure whatever may be drawn by this method, by varying the number and situation of the divisions.

R. H.

CHINESE PAINTS.

The peculiar beauty of the Chinese drawings is owing, not to the particular nature of the colouring substances, but merely to their preparation, and to their being mixed with *glue* or *size*, instead of *gum-water*, as is the common practice in Europe.

In regard to the preparation, two things must be observed; first, that the beauty of the colour depends, in a very great measure, upon the fineness of its particles, the finest being always the most beautiful. A Chinese painter often employs a man for three or four days to grind a small quantity of vermilion in a porcelian mortar, and it is from this they derive their fine reds. It is, therefore, necessary to levigate the paints to a very great degree of subtility, in order to let them acquire the *utmost degree of beauty* of which they are capable; and it must not be imagined that because they seem to be exceedingly fine to the touch, they may not be improved by farther grinding.

Secondly, it must be considered, that most mineral colours are prepared with acids, alkalines, or other salts, and that a small superabundance of those saline substances generally remains with them, which, after a shorter or longer time, produces considerable alteration in their brilliancy, and often entirely changes the colour.

In order to obviate this inconvenience, the paint, after having been levigathed, must be repeatedly washed in clean water; distilled water is the fittest; but the waters of many springs are sufficiently pure for this purpose. In order to effect this properly, put about half an ounce of the paint in a half-pint glass phial, and fill the rest of the phial almost entirely with water; shake it well; then let it stand for a while, and the coloured powder will soon fall to the bottom; then pour off the water by inclining the phial gently, so as not to disturb the sediment, and fill it again with clean water, and so on for five or six times; after which, the colour being gently dried, must be ground a little longer, and then it is fit for use.

The glue or size to be mixed with the paints, is extracted from parchment in the following manner:—Take about four ounces of clean parchment, cut it into small bits, and put it to soak in a quart of clean water for about twelve hours; then boil the whole on a gentle fire, and in the beginning take off the scum with a spoon. The vessel must remain always uncovered, and the liquor must be stirred now and then. After boiling for about an hour, take off the pot from the fire, and strain the liquor, whilst hot, through a coarse seive. The liquor must be put into a clean pot again over the fire, and boiled gently till half of it is evaporated; the remainder is then spread very thinly upon panes of glass, which being kept in a warm place for a day or two, the size will be dried, and will become very hard.

When it is wanted for use, put a small quantity of it in a cup of lukewarm water, and dip the hair-pencil in it.

The properties of this glue, which render it much superior to gum water, are the following: *It does not deaden or otherwise alter the colours* with which it is mixed. *It does not crack like gum;* and it becomes soon so hard *as not only to defend* the colours from being affected by smoke and other vapours, but even to bear the surface of the drawing being cleansed by means of wet sponge.

WM. GALWARD.

Lond. Mec. Mag.

INCORRECTNESS OF IRON MEASURING CHAINS.

Land-surveyors and others, who have occasion to use chains for measuring land, ought to use copper wire for the purpose; as I have proved that a chain of 60 feet long, made of iron wire, lengthened 14 inches from its being oxidized: copper does not yield to the oxide as iron does.

A. BANAT.

Lond Mech. Mag.

RED MARKING INK.—Vermillion half an ounce, sal of steel one drachm, finely levigated with linseed oil to a proper consistency.

Lond. Mec. Reg.

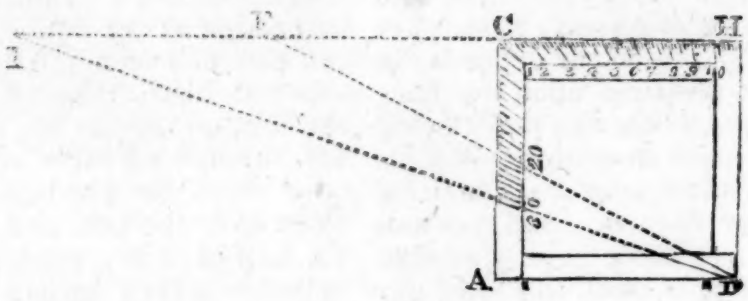
SHORT METHOD OF MEASURING HEIGHTS.

SIR,—I beg leave to send you the description of a simple instrument, of my own construction for ascertaining Heights without calculation, which may some times be found useful, particularly in measuring standing timber.

I am, Sir, yours, &c.

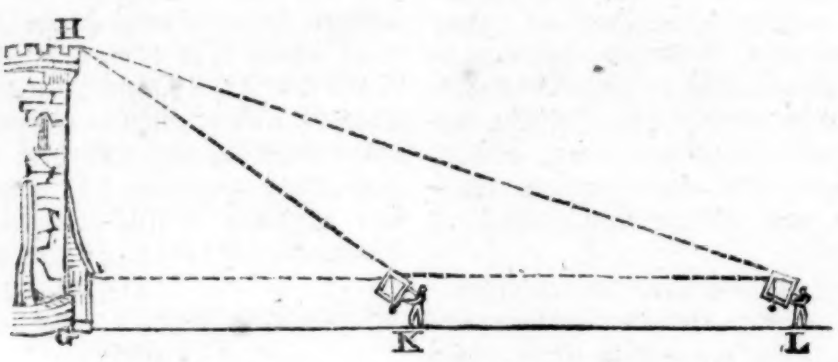
SAMUEL MAINLEY.

Worcester, Sept. 1824.



Description.

Construct a square (A B C D, fig. 1st,) of any given size; divide the side (B C) into ten equal parts, and number them from B to C; subdivide each of these into ten, and continue these equal divisions on the straight line (B C E F) to any distance; but to twice the length of BC, as at F, will be found quite sufficient.—Draw straight lines from all the divisions in B F to the point A, as F A, E A, C A, &c.; cut out the square (A B C D,) and paste it on a board or frame—place two sights on the side (A D,) and let a plummet be suspended by a fine thread from the point (A,) and the instrument (ABCD) is complete.



To find the height of an object having the base (KG) given (fig. 2nd.)

Look through the sights (DA) at the object (H,) and the plummet-line will show its height, in decimals, to the hundredth part of the base (K G)—— For example: suppose the base (K G,) to be 65 feet, and, looking through the sights at the object (H,) the line stands at ·83; then 65×·83=53·95 feet, the height of the object. It would, however, be most convenient to let the base (KG) be 10 or 100 feet, yards, &c.; then the plumb-line will show the height at once, without even multiplication, but to which, of course, the height of the eye must be added.

And, by a little calculation, the height and distance of an object may be found, the base of which is inaccessible: thus, if at K the plumb-line stand at ·73, and, by moving 40 yards in a direct line from the object to L, the plumb-line cut ·47, what are the height and distance?

Let x=(g h) and y=k g,

then ·73 $y=x$, and also $y+40\times{\cdot}47=x$; therefore ·73 y=·47 y+18·80, and y the base=72·3 yards,

and x the height=52·78 yards.

Lond. Mec. Mag.

MAGNETIC INTENSITY.

Mr. G. Harvey, M. G. S., &c. has found, by Coulombe's apparatus, that a box chronometer exhibited singular proofs of strong and active magnetism. It contained a remarkable quantity of steel, and every part of it exhibited vigorous polarity. Every screw displayed its influence and the frame alone contained ten large and several small screws; and the same intense and active magnetic power was exhibited by the chain, the axles of the wheels and pinions, the arbor of the fusee, and the balance of its springs. Mr. Cox, the agent for Arnold's chronometor at Plymouth, remarked, when he saw this chronometer, that it appeared nothing less than a *magazine of magnets*. Mr. Scoresby recommends platina, or an alloy of platina, for the balance of chronometers. Gold is said to be considered as well adapted for the balance-spring.

Lond. Mec. Mag.

NEW PYROPHORUS, OR INSTANTANEOUS FIRE LIGHTER.

In determining the composition of tartate of lead, Dr Friedmann Gobel of Jena, observed that this salt when heated in a glass tube, formed a fine pyrophorus. When a portion of the deep brown mass is projected from the tube, it instantly takes fire, and brilliant globules of metallic lead appear on the surface of the substance in ignition. The effect continues much longer than in other pyrophori.

Lond. Mec. Mag.

EFFECT OF MUSIC ON ANIMALS.

In the human ear the fibres of the circular tympanum radiate from its centre to its circumference, and are of equal length; but Sir E. Home has found that in the elephant, where the tympanum is oval, they are of different lengths, like the radii from the focus of an ellipse. He considers that the human ear is adapted for musical sounds by the equality of the radii; and he is of opinion that the long fibres in the tympanum of the elephant enable it to hear very minute sounds, which it is known to do. A pianoforte having been sent on purpose to Exeter Change, the higher notes hardly attracted the elephant's notice, but the low ones roused his attention The effect of the higher notes of the piano-forte upon the great lion in Exeter Change was only to excite his attention, which was very great. He remained silent and motionless; but no sooner were the flat notes sounded, than he sprang up, attempted to break loose, lashed his tail, and seemed so furious and enraged as to frighten the female spectators. This was attended by the deepest yells, which ceased with the music. Sir E. Home has found this inequality of the fibres in neat-cattle, the horse, the deer, the hare, and the cat.

Lond. Mec. Mag.

ACCOUNT OF THE ODOMETER, AND THE INVENTOR, HOHLFELD.

An *odometer* is a machine by which the steps of a person who walks, or the revolutions of the wheel of a carriage may be counted, and by which the distance that one has travelled may be ascertained. Vitruvius mentions a machine of this kind, and which he thinks might answer for a ship. From a carving in the palace at Urbino, it is evident that this machine was known in the fifteenth century. In a treatise of Mechanical instruments, published at Frankfort, 1604, mention is made of an odometer, without naming the inventor.

The Emperor Rudolphus II who reigned from 1576 to 1612, had two very curious odometers, which not only pointed out distances, but also marked them upon paper by the way.

One Butterfield in England, invented an odometer, which was greatly esteemed. But an artist named Hohlfeld, born at Hennerndorf, in the mountains of Saxony, in 1711, constructed one upon better principles, and brought it to such perfection, that he may with justice be denominated the inventor of this singular machine. He was a man of such rare talents, and of such benefit to

the public, that the following brief sketch of his life may be acceptable and stimulating to that class of society for whose instruction and amusement this work is devoted. It was originally written by Professor Muller, at Berlin:—

"Hohlfeld learned the trade of lace-making, at Dresden, and early discovered a taste for mechanical pursuits, by constructing several kinds of clocks. To improve in his trade, he removed from Dresden to Berlin. He soon became an excellent workman, and invented several machines for shortening his labour, which afforded him leisure to pursue his mechanical studies. The result was, that during that period he constructed several air-guns and clocks.

"In 1748 he had the good fortune to become acquainted with the celebrated Sulzer, at whose suggestion he constructed a machine for noting down any piece of music when played upon a harpsichord. A machine of this kind had previously been invented by Von Unger, but Hohlfeld had never seen it. In two weeks this untaught mechanic, without any other assistance than the vigor of his own genius, completed the machine which Von Unger himself could not, for want of an artist able to comprehend his ideas. This machine is now in the possession of the Academy of Sciences at Berlin, and by means of a drawing, it was introduced into England. But though this invention was universally applauded, yet none had the generosity to reward the ingenuity and industry of the inventor.

"About 1756 the Prussian minister, Count de Podewils, employed Hohlfeld chiefly for the purpose of constructing water-works for his magnificent gardens at Gusow.—There he invented a well-known thrashing mill, and another for chopping straw with more expedition.—He also constructed a machine which, being fastened to a carriage, indicates the revolutions made by the wheels. It will be admitted that such a machine was invented before, but his was upon better principles, and more accurate and simple. Sulzer used this machine in his tour, and found that it answered the intended purpose.

"In 1765 the Duke of Courland visited Hohlfeld in Berlin, and offered him a pension of 800 ix-dollars to remove to Courland; but this ingenious man was so content with his condition, and so much attached to his friends, that he declined acceptance of such an enticing offer. Informed of his conduct, the king appointed him a pension of 150 dollars.

"He also constructed several other machines, and among them one for weaving figured stuffs, so contrived that the weaver had no need of any instrument to shoot through the woof (which is still in the possession of the Academy of that place;) also, a pedometer for carrying in the pocket; a convenient and simple bed for a sick person, which was of such a nature that the patient with the smallest strength could at anytime rise or lower the breast, and, when necessary, convert the bed into a stool: and a carriage so framed, that if the horses took fright or run off, the person in it could, by a single push, loosen the pole, and set them at liberty.

Every machine that came under the inspection of this singular man, he altered and improved in the simplest manner. He made and repaired all his own instruments. But as he was fonder of inventing than imitating the inventions of others, he constructed them in such a manner that none but himself could use them to advantage. Several of his inventions were copied, but in a very clumsy manner.

"His conception was almost instantaneous, and when he conceived the idea, he instantly put it in execution. In a moment he comprehended what was proposed, and discovered whether or not it was practicable; and if he was convinced that it was not practicable, neither money nor advice could prevail upon him to make the attempt. The same rapidity of conception that he displayed in mechanics, he displayed in all other pursuits. His observations upon most subjects were not only judicious, but peculiar to himself, so that without

exaggeration, it may be said that he was born a mechanical philosopher.

"With regard to moral character, which always ennobles every man, he was very different from the generality of the same class in society.—Though he still retained a tint of his original manners, yet his mild and civil deportment rendered his company and conversation agreeable. His life was sober and regular, and his heart was good. Though he was every day invited to the tables of some one in high rank, yet he staid for the most part at home, preferring domestic to foreign pleasures. He went to market for his own provisions, which he cooked, and was as contented over his humble meal as Curius was over his turnips.

"A little before his death he had the pleasure of seeing a curious harpsichord which he had constructed purchased by his Prussian majesty, and placed in an elegant apartment of his palace at Portsdam Having for some time neglected this instrument, the vigorous application that he bestowed in putting it in order, brought on that disease which proved fatal. His favourite clock being disordered during his illness, he could not be persuaded by his friend and physician, Dr. Stahls, from repairing it. Close application occasioned some obstructions, which were not observed until too late, and he died 1771, at the house of Count de Podewils, in the 60th year of his age. Although he left no son either to imitate his virtues or rival his genius, yet the productions of his inventions will immortalize his name, and serve to strike the fire of genius from the minds of other industrious mechanics."

Lond. Mec. Mag.

SPORTSMAN'S VADE-MECUM.

We have seen Mr. Linnie's new invention. It is a curious piece of mechanism, comprising a complete fowling-piece, barrel 33 inches long calibre 5-8ths inches, detonating lock, butt with proper angle, ramrod, &c.; a complete fishing-rod about 12 feet long, dog-call, looking-glass, and snuff-box, with pen, in the small compass of an ordinary-sized walking-stick, weighing about 3 1-2lbs.—When used as a fowling-piece, it contains a flask with powder and shot sufficient for 12 or 14 charges, and can be used as a walking-stick or fishing-rod, loaded and primed with the greatest safety. Its portability is such that it can be transformed and re transformed to all its purposes, including loading priming, and firing, in the short space of three minutes. Mr. Linnie is a native of Kirkwall, in Orkney, and is now on his way to Edinburgh and London, for the purpose of laying his invention before the Societies for the Encouragement of Arts.

Inverness Courier.

CHANGE OF THE SEAT OF COLD DURING FROST.

It is both clearly proved and philosophically accounted for, that air is warmer close to the earth than at some distance above it, and we consequently find lofty mountains, even in warm climates, constantly crowned with snow. During a frost, however, things appear to be reversed. The experiment has been often made, and we take the most concise account, which is an observation made one winter in Hampshire. Mr. White placed a thermometer on the top of a hill in Silborne, and another in the valley, towards evening, of a very cold night. During the night, that in the valley went down to one degree below Zero, that is, 33 degrees below the freezing point; whereas that on the hill, 200 feet at least higher, fell only to 17 or 15 degrees lower than the freezing point. On the following morning that in the vale was at 20, while the elevated thermometer was at 22; so that the difference of cold between the two situations was once eighteen degrees less above than below, and through the whole frost continued ten or twelve. This variation in temperature was confirmed by the total destruction of the forest evergreens in the valley, those on the hill remaining unhurt.

Lond. Mec. Mag.

INTRODUCTION OF SILK INTO EUROPE.

Silk was long an indispensable appendage of luxury to Europeans before the manufacture of it was introduced amongst them. Immense sums were annually sent out of the Roman empire to the farthest parts of the then known world, for the purchase of a foreign manufacture, which employed no citizen or tributary subject; and a great part of the profits arising from so lucrative a commerce fell into the hands of the Persians, the inveterate enemies of Constantinople. In whatever manner indeed, the traffic had been carried on so copious an importation of so expensive an article from so vast a distance, must have tended to impoverish the empire. The Emperor Justinian had long desired to turn this lucrative commerce into a Roman channel; but insuperable obstacles prevented the execution of his design. Those difficulties, however, which all the policy of the Emperor could not remove, were surmounted by the enterprising sagacity of two persian monks, who, in the quality of missionaries, had long resided in China. Amidst their religious occupations, they had viewed with an investigating eye, the manufactures of silk in that country, the myriads of silk-worms, and the mode of their treatment. They discovered that the importation of so delicate and short-lived an insect, from so great a distance, was impracticable: but they imagined that in the eggs a numerous progeny might be preserved and propagated. Knowing how agreeable the undertaking would be to the imperial court at Constantinople, they arrived, after a long journey, at that metropolis of the Roman empire; and having imparted their project to the Emperor, were, by the liberality of his gifts, and the splendour of his promises, encouraged to carry it into execution.

The two monks having travelled back to China, and by concealing the eggs of the silk-worm in a hollow cane, deceived a people ever jealous of its commerce, returned in triumph to Constantinople, with the spoils of the East, having made a greater conquest than either Justinian or his celebrated general, Belisarius, had ever achieved. Under their direction the eggs were hatched by artificial heat; the worms were fed with leaves of the mulberry tree; they lived and laboured, and, by the use of proper means, the race was propagated and multiplied. Experience and reflection soon correct the errors incidental to a novel attempt; and in a short time the subjects of Justinian equalled the Chinese in the management of the insects and the manufacture of silk. From Constantinople this most valuable insect has been introduced gradually into all the southern parts of Europe; and the material produced by it is now manufactured in almost every country in this quarter of the globe. Thus, in consequence of a singular circumstance in the history of commeace, of which the epoch is assigned to A. D. 552, Modern Europe enjoys, at an easy expense, one of the most costly luxuries of the ancients, which was formerly peculiar to China, and once sold at Rome "*For its weight in gold!*"

Lond. Mec. Mag.

BLEACHING SUGAR.

It is announced in a French Journal, that *chlorate of lime*, which is now so extensively employed in bleaching linen, may also be successfully applied, both in its gaseous and liquid state, to bleaching sugar. As the gas is formed, it is conveyed into a solution of sugar previously filtered, and its absorption is promoted by agitating the sugar. When the colour which is required is obtained, the liquor is filtered over lime to separate the muriatic acid, and then over a preparation of animal carbon.—Immediately after the filtration, the syrup is concentrated by the usual method. The gas may also be applied to suguar already crystalized, by spreading it over shelves, made altogether of wood, or of hair cloth, and placed round an apartment, into which the gas is conveyed as it is produced. The sugar is spread out on very thin layers, and is sometimes

stirred by means of rakes. The sugar must afterwards be exposed to the action of lime to separate the excess of muriatic acid. The liquid chlorate may also be employed, by adding it to the filtered syrup, in the proportion of one fifth, and agitating the mixture, then boiling it with animal carbon, filtering, and again agitating with another dose of chlorate, amounting to the sixth part of the whole These operations are again repeated with the chlorate, in the proportion of a tenth part, and the syrup is finally filtered, and it passes clear and transparent like water. In the second mode of application, the animal charcoal is first added, and then the chlorate, after which the same agitating and filtering, as above described, is again to take place —— The chlorate may also be employed to bleach molasses, so that it may be used on several occasions, when it is now rejected in consequence of its colour. The author gives no estimate of the advantages of employing the chlorate of lime, and therefore we are quite unable to say whether his method is an improvement or only a novelty.

London Chemist.

HINT TO WORKING GOLDSMITHS.

SIR,—Observing, in your valuable Magazine, descriptions of two machines, one to enable shoemakers, and the other to enable tailors, to do their work standing, I am induced to suggest a similar contrivance for the convenience of goldsmiths. Being one of the latter trade, I know the injurious effects of sitting all day, and am therefore doubly anxious to remove them. Generally speaking, we find mechanics pale and meagre in countenance; and this we may reasonably ascribe to their being confined in unwholesome workshops, amidst charcoal fumes, the smoke of lamps, &c. All this is unavoidable; but sitting is not; from which pernicious custom, weak knees, weak loins, round shoulders, crooked legs, contraction of the chest, and difficulty of breathing, all originate, proving the death of some, and the misery of but too many.

Shoemokers—indeed every mechanic—ought to be obliged to the inventor of the Shoemaker's Standing Machine. In the course of twenty or thirty years, if this standing plan is followed, we may expect to see shoemakers and other mechanics, who pursue their occupations within doors, become fine, well-grown, able, and hearty men, fit for soldiers and sailors, which now-a-days every one knows they are far from being.

I propose, for goldsmiths, to do away with stools altogether, and to use, instead of them, one, two, three, or more moveable steps. Some jobs require the workman to be more elevated, and in this way he may accommodate himself. The boards, of course, would require to be raised much higher than they are now—to the height, perhaps, of the highest man. It is easy to see that this improvement would be attended with little expense or trouble. For the first week or so the workman would feel awkward, and grow much sooner tired; but after a little while, I think, he would feel no more inclination to sit than a blacksmith or a carpenter.

A GOLDSMITH'S APPRENTICE.

Lond. Mec. Mag.

TO PRESERVE WATER AND MEAT FROM PUTREFACTION IN LONG VOYAGES.

The crews of two Russian ships which lately sailed round the world were extremely healthy; during the whole three years of their voyage, only two men died of the crew of the Neva, and the Nevashda did not lose a single man It is already known that their fresh water was preserved in charred casks, but it is not so generally known that they used the same precaution for preserving their salted provisions. The beef they carried out with them tasted as pleasantly upon their return as it did three years before, when first salted.

Lond. Mec. Mag.

CASHMERE SHAWLS.

Most of these articles are exported from Cashmere in an unwashed state, and fresh from the looms. Sixteen thousand looms are supposed to be in constant motion there, each of them giving employment to three men, whose wages are about three pice a-day. It is calculated that eighty thousand shawls are disposed of annually. The wool from Thibet and Tartary is the best, because the goat which produces it thrives better there: twenty-four pounds weight of it sells at Cashmere, if the best sort, for twenty rupees; an inferior or harsher kind may be produced for half the money. The wool is spun by women, and afterwards coloured. When the shawl is made, it is carried to the custom-house and stamped, and a duty paid agreeable to its texture—one-fifth of the value. The persons employed sit on a bench at the frame, sometimes four people at each frame; but if the shawl is a plain one, only two. A fine shawl, with a pattern all over it, takes nearly a year in making.—The borders are worked with wooden needles, having a separate needle for each colour. There is a head man who superintends and describes the pattern. The rough side of the shawl is uppermost while manufacturing.

Lond. Mec. Mag.

IMPROVEMENT IN DRAWING IRON AND STEEL WIRE.

The acid liquor used in pickling iron-wire during the drawing of it requiring to be warmed, at an eminent manufactory, ingots of brass, lying at hand, were accordingly heated red-hot and quenched in the liquor; the consequence of this was, that a portion of the copper in the brass became dissolved in the liquor, and was precipitated upon the surface of the iron wire pickled in it. It was found that the wire thus coated passed through the holes in the plates with remarkable facility, it requiring to be annealmuch less frequently than before, owing, no doubt, to the copper preventing the action of the plate upon it, so as to gall or fret it, and, it fact, lubricating it as it were. The head of this manufactory has since constantly availed himself of the use of a weak solution of copper in iron and steel wire drawing. The slight coat of copper is entirely got rid of in the last annealing process.

Lond. Mec. Mag.

VELOCITY OF SOUND.

A paper by Dr. Gregory was read at a late meeting of the Cambridge Philosophical Society, containing an account of some experiments made in order to determine the velocity with which sound is transmitted through the atmosphere. Some of the results of these experiments are the following:—That wind greatly affects sound in point of *intensity*, and that it affects it also in point of velocity; that when the direction of the wind *concurs* with that of the sound, the *sum* of their separate velocities gives the *apparent* velocity of sound;—when the direction of the wind *opposes* that of the sound, the *difference* of the separate velocities must be taken; that in the case of echoes, the velocity of the *reflected* sound is the same as that of the *direct* sound, and that, therefore, distances may frequently be measured by means of echoes; finally, that an augmentation of temperature occasion an augmentation of the velocity of sound, and *vice versâ*.

Lond. Mec. Mag.

QUERE.

Sir,—I wish to be informed, through the medium of your valuable work, from which I have already gained much information, of the most proper way of making a cement for joining broken china and glass.

Your well-wisher,

W. W. T.

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Broadway, New-York, will receive due attention.

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